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Zeitschrift für Physik

Neu eingegangene Arbeiten

R. Keil, A. Schabert, and P. Toschek, Institut für Angewandte Physik der Universität Heidelberg:

Collisional Broadening of Saturated Absorption in Neon

Saturation spectroscopy involving laser light fields of two different frequencies has been applied to the investigation of Ne*-Ne collisions in an absorptive neon discharge. The pressure broadening of the saturation signals is interpreted in terms of "weak" collisions. Half the signal width results from velocity shifts of $2p_4$ atoms rather than from oscillator dephasing. The mean velocity shift is considerably larger than in collisions with helium atoms.

H. Engel, E. Gerst, H. Schneider, Strahlenzentrum, Abteilung Angewandte Kernphysik der Justus Liebig-Universität Gießen:

Lebensdauermessungen am 341,2 keV-Zustand und am 404,8 keV-Zustand in ^{131}Xe (Lifetime Measurements of the 341.2 keV Level and of the 404.8 keV Level in ^{131}Xe)

Lifetime measurements of two excited states in ^{131}Xe populated by the decay of ^{131}J have been carried out. Analysis of data, delivered from a delayed γ-γ-coincidence experiment with a Ge(Li)-Plasticdetector combination, resulted in the following values:

$T_{1/2}$ of 341.2 keV level in ^{131}Xe: (2.15 ± 0.07) ns

$T_{1/2}$ of 404.8 keV level in ^{131}Xe: < 0.5 ns.

H. Rebel and G. W. Schweimer, Zyklotron-Laboratorium des Kernforschungszentrums Karlsruhe:

Size and Shape of the Nuclear Density Distributions of ^{20}Ne and ^{28}Si from 104 MeV Alpha Particle Scattering

Measured differential cross sections for the scattering of 104 MeV α particles from ^{20}Ne and ^{28}Si are analyzed on the basis of a deformed folding model. Rms-radii and values of the deformation parameters for the nuclear density distributions are extracted, and the effect of the size of the α particle is demonstrated. Previous discrepancies between (p, p') and (α, α') results are partly removed.

H. V. Klapdor, H. Reiss, Max-Planck-Institut für Kernphysik, Heidelberg:

Spin Assignments by a High Spin Selective Heavy Ion Reaction

The reaction $^{12}C(^{14}N, d)^{24}Mg$ is investigated at $E_{Lab} = 52$ MeV by means of a multigap magnetic spectrograph. Angular distributions of levels between 6.00 and 20.21 MeV are measured using nuclear track emulsions. By quantitative analysis of the angular distributions (FRDWBA- and Hauser-Feshbach calculations), the reaction is shown to proceed almost completely via compound mechanism. The reaction is applied for selective excitation of high spin states in ^{24}Mg. Evidence is given by this example that under suitable chosen conditions a heavy ion reaction can be a powerful means for spin assignments at high excitation energies.

A. Järund, B. Friberg and B. Forkman, Department of Nuclear Physics, Lund Institute of Technology Department of Physics, University of Lund:
Photoproduction of ^{24}Na from Nuclei with $13 \leqq Z \leqq 29$

The yields of the reactions Nucleus$(\gamma, yp\,xn)^{24}$Na have been measured for eleven elements with $13 \leqq Z \leqq 29$ at maximum bremsstrahlung energies 100 MeV $\leqq E_{\gamma\,max} \leqq$ 1000 MeV. An exponential decrease with increasing Z of the mean cross section calculated from the yield data has been obtained. This Z-dependence fits well to the systematics of spallation product cross-sections.

B. Johnson, M. Senglaub, P. Richard, and C. F. Moore, Center for Nuclear Studies University of Texas, Austin, Texas:
Potassium and Titanium *K* X-Ray de-Excitation Induced by Ion Bombardment

K X-ray de-excitation spectra have been produced for K and Ti by proton, alpha and oxygen ion beam bombardment. These spectra have been measured with a crystal spectrometer of resolution (FWHM) of 10 and 13 eV for the $K\alpha_{1,2}$ line in K and Ti respectively. The additional lines not found in the normal X-ray spectra are attributed to multiple inner shell ionization. The energy shifts and relative intensities of these lines are compared to theoretical predictions.

P. Reineker, Abteilung für theoretische Physik I, Universität Ulm, Germany:
Equations of Motion for the Moments of the Coupled Coherent and Incoherent Motion of Triplet and Singlet Excitons

A set of differential equations is derived giving all moments of exciton motion. In contrast to previous calculations, interaction with all neighbours is allowed extending the validity of the equations also to singlet excitons. The second moment is calculated explicitely.

M. V. Fedorov and A. E. Kazakov, P. N. Lebedev Physical Institute of the Academy of Sciences of the USSR:
An Electron in a Quantized Plane Wave and in a Constant Magnetic Field

The Dirac equation is considered for an electron in a constant homogeneous magnetic field and in a quantized electromagnetic plane wave propagating along the direction of the former. This problem is shown to be reduced to the Schrödinger equation for a system of many interacting oscillators. The corresponding Hamiltonian is diagonalized. An equation is established relating the total energy with the moment of a system along the magnetic field. Approximate solutions of this equation are given. A behaviour of a system close to cyclotron resonance is discussed.

E. D. Mshelia, Institut für Theoretische Physik der Universität Frankfurt, Frankfurt am Main, Germany,
R. F. Barrett, School of Physics, University of Melbourne, Victoria 3052, Australia:
Continuum Nuclear Structure of ^{12}C in the Collective Correlation Model

On the basis of the Collective Correlation Model the giant dipole resonance of ^{12}C is investigated treating the one particle continuum states in the framework of the eigenchannel theory of nuclear reactions. Total, partial and integrated photo-reaction cross-sections are calculated; whereby the low-lying negative parity energy states of the mass 11 nuclei are properly taken into account.

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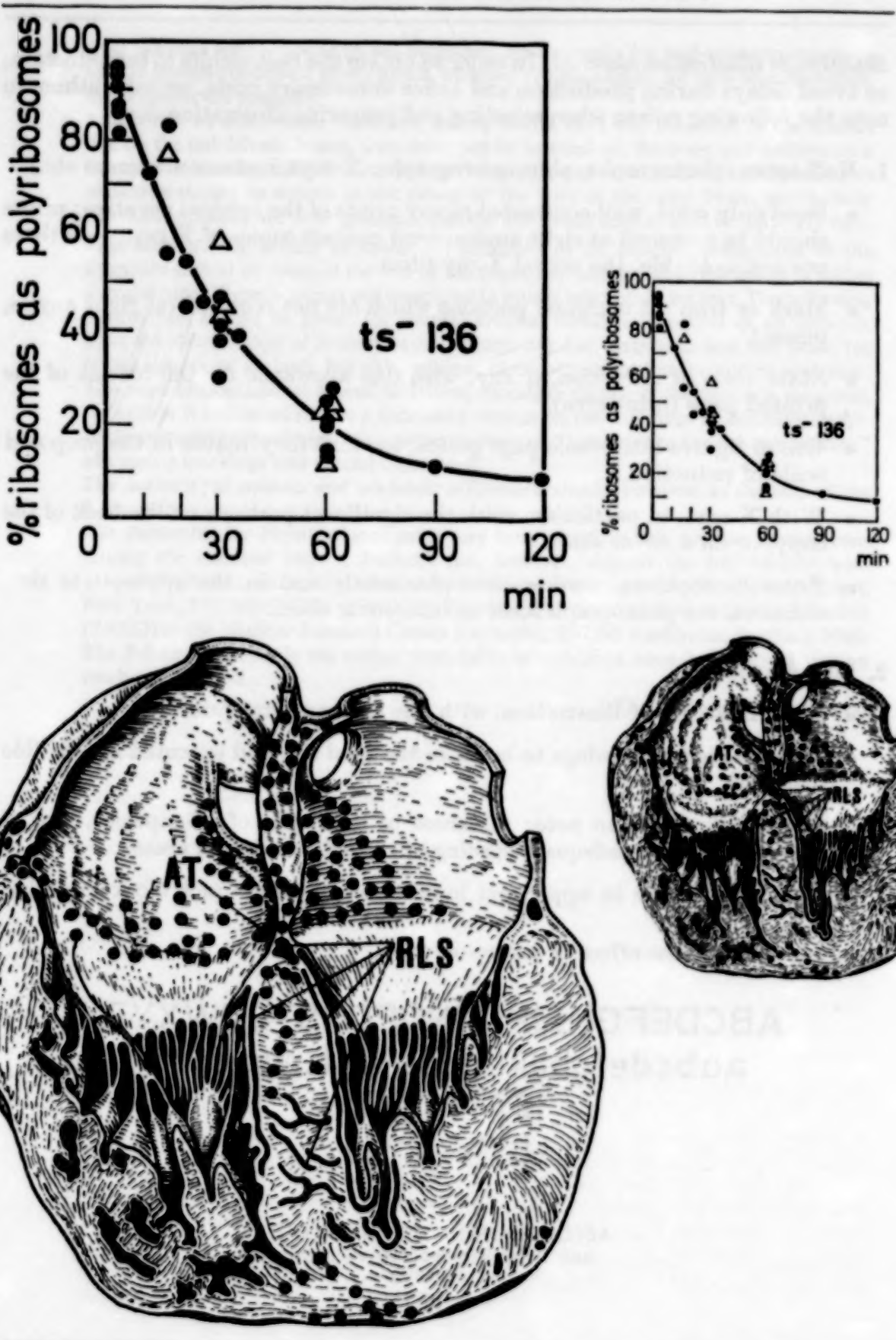

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